

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 29 APR 2004

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| Applicant's or agent's file reference<br><b>60274-080</b>   | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |  |
| International application No.<br><b>PCT/US03/04941</b>  | International filing date (day/month/year)<br><b>18 February 2003 (18.02.2003)</b>  | Priority date (day/month/year)<br><b>26 July 2002 (26.07.2002)</b> |
| International Patent Classification (IPC) or national classification and IPC<br><b>IPC(7): B01D 53/06 and US Cl.: 96/125, 131, 146, 154; 95/113</b>   |   |  |
| Applicant<br><b>DOURR ENVIRONMENTAL INC.</b>  |   |  |
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>4</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul> |   |  |
| Date of submission of the demand<br><b>17 February 2004 (17.02.2004)</b>  | Date of completion of this report<br><b>05 April 2004 (05.04.2004)</b>  |  |
| Name and mailing address of the IPEA/US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230   | Authorized officer<br><b>Frank M. Lawrence</b> <i>Frank Lawrence</i><br>Telephone No. 571-272-0987 <b>4-504</b>               |  |

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/04941

## I. Basis of the report

### 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed.
- ☒ the description:  
 pages 1-8 as originally filed  
 pages NONE, filed with the demand  
 pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the claims:  
 pages NONE, as originally filed  
 pages 9-11, as amended (together with any statement) under Article 19  
 pages NONE, filed with the demand  
 pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the drawings:  
 pages 1-2, as originally filed  
 pages NONE, filed with the demand  
 pages NONE, filed with the letter of \_\_\_\_\_.
- ☐ the sequence listing part of the description:  
 pages NONE, as originally filed  
 pages NONE, filed with the demand  
 pages NONE, filed with the letter of \_\_\_\_\_.

### 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

### 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

### 4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☒ the claims, Nos. 14-18
- ☐ the drawings, sheets/fig NONE

### 5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/US03/04941

## V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. STATEMENT

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Claims <u>1-13</u> | YES |
|                               | Claims <u>NONE</u> | NO  |
| Inventive Step (IS)           | Claims <u>1-13</u> | YES |
|                               | Claims <u>NONE</u> | NO  |
| Industrial Applicability (IA) | Claims <u>1-13</u> | YES |
|                               | Claims <u>NONE</u> | NO  |

### 2. CITATIONS AND EXPLANATIONS

Claims 1-13 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a sorption concentrator or method as described in the independent claims, wherein the sorption units each include an integral semi-conductive foil substrate formed of a plurality of semi-conductive foil elements including parallel convoluted surfaces and parallel channels extending generally parallel to a direction of flow.

Claims 1-13 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

-9-  
CLAIMS

1 PEA/US

What is claimed is:

- 5           1.     A sorption concentrator for removing contaminants from a gas stream, comprising:
- a plurality of adjacent generally rectangular sorption units;
- a gas flow system directing gas to be cleaned through a majority of said plurality of sorption units during a sorption cycle and directing a separate clean gas stream
- 10           through the remaining sorption units during a desorb cycle;
- said plurality of adjacent sorption units each including an integral semi-conductive foil substrate formed of a plurality of semi-conductive foil elements including parallel convoluted surfaces and parallel channels extending generally parallel to a direction of flow of said gas to be cleaned during said sorption cycle and said clean gas stream during
- 15           said desorption cycle extending from an inlet to an outlet of said sorption units conductively bonded together to form an integral semi-conductive substrate coated with a sorption material; and
- a source of electrical current connected to said semi-conductive foil substrate rapidly resistively heating said remaining sorption units during said desorption cycle.
- 20           2.     The sorption concentrator as defined in Claim 1, wherein said integral semi-conductive foil substrate is formed of aluminum foil.
3.     The sorption concentrator as defined in Claim 2, wherein said aluminum foil substrate has a thickness between 0.005 mm and 2 mm.
- 25           4.     The sorption concentrator as defined in Claim 1, wherein said aluminum foil substrate has a thickness of between 0.005 mm and 2 mm.
5.     The sorption concentrator as defined in Claim 2, wherein said aluminum foil substrate has a thickness of between 0.05 mm and 1 mm.

[Replacement Sheet]

AMENDED SHEET

-9A-

6. The sorption concentrator as defined in Claim 2, wherein said aluminum foil substrate has a thickness of between 0.1 mm to and 0.3 mm.

7. The sorption concentrator as defined in Claim 1, wherein said integral semi-conductive foil substrate comprises a honeycomb formed of a plurality of generally

parallel corrugated semi-conductive foil sheets each conductively bonded in electrical contact to a generally planar semi-conductive base sheet and coated with a sorption material.

5 8. The sorption concentrator as defined in Claim 1, wherein said integral semi-conductive foil substrate comprises a plurality of parallel semi-conductive foil tubes conductively bonded together in electrical contact formed of a semi-conductive foil coated with a sorption material extending parallel to said direction of flow of said gas to be cleaned during said sorption cycle and parallel to said clean gas stream during said desorb cycle.

10 9. The sorption concentrator as defined in Claim 1, wherein said sorption material is selected from the group consisting of activated carbon, zeolite and porous polymers bonded to said semi-conductive foil substrate.

Please cancel Claims 10 through 18.

15 10. (New) A method of removing contaminants from a gas stream, comprising the following steps:

20 forming a plurality of generally rectangular sorption units by forming a plurality of separate semi-conductive foil elements including parallel convoluted surfaces, conductively bonding said semi-conductive foil elements together forming an integral semi-conductive foil substrate having a plurality of parallel channels extending from an inlet to an outlet of said sorption units and coating said integral semi-conductive foil substrates with a sorption material;

directing a stream containing contaminants through said parallel channels of a plurality of said sorption units, wherein said sorption material collects said contaminants; and

25 applying an electric current to said integral semi-conductive foil substrate of at least one of said sorption units, thereby rapidly heating said integral semi-conductive foil substrate of said one of said sorption units and simultaneously directing clean air through said one of said sorption units, thereby desorbing said contaminants during a desorption cycle.

30 11. (New) The method of removing contaminants from a gas stream as defined in Claim 10, wherein said method includes coating said semi-conductive substrate with a sorption material by dipping said integral semi-conductive substrate in a slurry of sorption

[Replacement Sheet]

AMENDED

material, removing said integral semi-conductive foil substrate from said slurry and drying said coating of sorption material on said semi-conductive foil substrate.

12. (New) The method of removing contaminants from a gas stream as defined in Claim 10, wherein said method includes forming a plurality of separate semi-conductive foil elements from an aluminum foil.

13. (New) The method of removing contaminants from a gas stream as defined in Claim 10, wherein said method includes forming said plurality of separate semi-conductive foil elements from a semi-conductive foil having a thickness of between 0.005 mm and 2 mm.